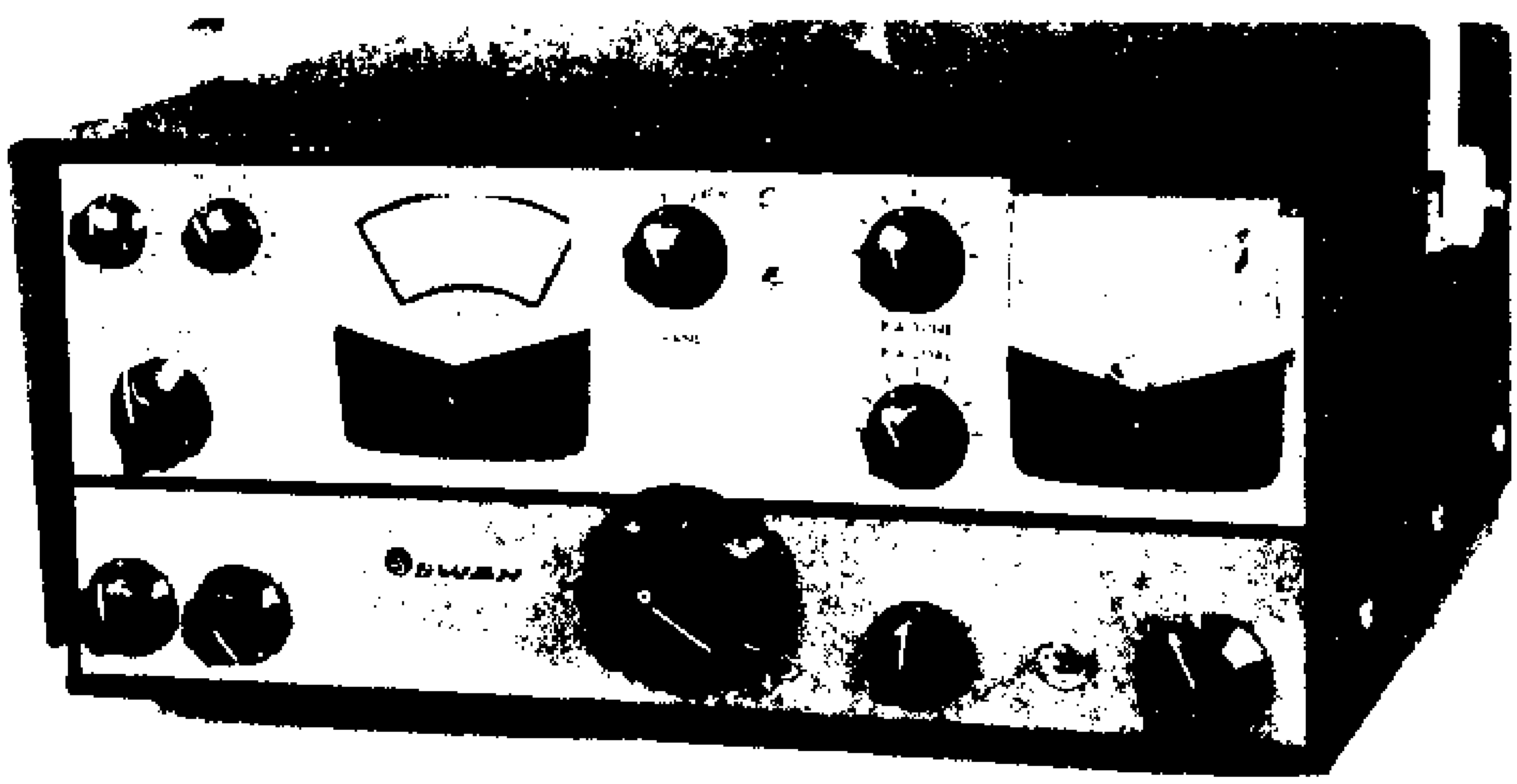


# I GENERAL DESCRIPTION

The Swan Model 240 is a single sideband, suppressed carrier transceiver designed specifically for use on the 20-, 40-, and 75-meter amateur radio bands. With the transceive operation, the transmitted signal is automatically tuned to the received frequency. On the 20-meter band operation is upper sideband, cn the 40- and 75-meter bands, operation is on lower sideband. Provisions have been included in the transceiver for operation on the other sideband, if desired.

Basic circuitry of the Swan 240 transceiver has been proven in thousands of hours of operation of the popular single band, Swan 100 series of transceivers. Mechanical, electrical, and thermal stability are exceptionally high. Oscillators are voltage regulated and temperature compensated. Suppression of the unwanted sideband is accomplished by means of a high-frequency crystal lattice filter, which is also used to obtain exceptional selectivity in receiving. Nominal bandwidth on transmit and receive is 3 kc.

The Swan transceiver is designed for fixed, portable, or mobile operation when used in conjunction with a suitable power supply. Push-to-talk operation is possible in all installations, and normal operation with two-contact microphones is possible through the function switch. AM transmission, (Single Sideband with Carrier) is accomplished by allowing carrier to be transmitted with the single sideband, and receiver tuning for AM reception is accomplished by zero-beating the received carrier.




www.everything4lessstore.com

## II SPECIFICATIONS

| | |
|---|---|
| FREQUENCY RANGES | |
| 20 Meters (Upper Sideband)* | 13,990 to 14,380 kc |
| 40 Meters (Lower Sideband)* | 6,900 to 7,340 kc |
| 75 Meters (Lower Sideband)* | 3.640 to 4.030 kc |
| POWER INPUT | |
| Single Sideband | |
| 600 volt dc high voltage | 180 Watts. PEP |
| 800 volt dc high voltage | 240 Watts. PEP |
| C.W | 200 Watts DC input |
| AM (Single Sideband With Carrier) | Approx. 60 Watts input |
| METHOD OF GENERATING SSB | High frequency crystal lattice filter centered at 5174.5 kc. Single conversion employed on both transmit and receive. Bandwidth. 3 kc nominal at 6 db down. both transmit and receive. |
| UNWANTED SIDEBAND SUPPRESSION | Approximately 40 db |
| CARRIER SUPPRESSION | Approximately 50 db |
| TRANSMITTER OUTPUT IMPEDANCE | Pi-network output matches antennas essentially resistive at 20 to 300 ohms impedance. |
| RECEIVER SENSITIVITY | Less than 1 microvolt at 50 ohms input impedance for a signal-plus-noise to noise ratio of 10 db. |
| AUDIO RESPONSE | Essentially flat 300 to 3000 cps on both receive and transmit. |
| RECEIVER OUTPUT | 3 watts audio at 3.2 ohms. |
| FRONT PANEL CONTROLS | Main Tuning, RF Gain, AF Gain. Mic. Gain, Carrier Balance, Exciter Tune,. PA Tune, PA Load, Function Switch, VFO Bandswitch, Main Bandswitch. Filament ON-OFF. |
| METERING | PA Cathode Current. 0-400 ma. |
| DIMENSIONS | Width 13 1/4 in., Height 5 5/8 in., Depth 11 in. |
| WEIGHT | 11 1/2 pounds. |

*Opposite Sideband Optional Addition, See Section VII.

| TUBE COMPLEMENT | 14 tubes plus voltage regulator |
|---|---|
| Tube Power Amplifier | |
| 8236 — ~~6DQ5 Power Amplifier~~ | 6AL5 AGC Rectifier |
| 6BE6 Transmitter Mixer | 12BY7A Driver |
| 6BA6 Receiver RF Amplifier | 6AU6 VFO |
| 6CB6 1st IF Amplifier | 12BE6 Receiver Mixer |
| 7360 Balanced Modulator | 6BA6 2nd IF Amplifier |
| 12AU7 Microphone Amplifier | 6V6GTA AF Output |
| 6U8A Carrier Oscillator | 12AX7 Product Detector & 1st AF Amplifier |
| OD3 Voltage Regulator | |

POWER SUPPLY REQUIREMENTS

| | |
|---|---|
| Filaments | 12.6 volts at 3.45 amps, ac or dc |
| Relay | 12 volts dc |
| Bias | -100 volts dc at 5 ma |
| Medium Voltage | +275 volts dc at 110 ma |
| High Voltage | +600 to 800 volts dc at 300 ma., transmit only. |

Swan SW-12DC and Swan SW-117AC power supplies are recommended for mobile and fixed station use, respectively.

EXTERNAL TERMINALS — SPDT relay terminals on rear panel for auxiliary switching linear ampl.





www.everything4lessstore.com

## III CIRCUIT THEORY

The Swan 240 Transceiver is designed to provide single sideband, suppressed carrier transceive operation, and generates the transmitted single sideband signal by the crystal lattice filter method. To permit a logical discussion of this mode of operation, certain definitions are required. In a normal AM signal (double sideband with carrier), a radio frequency signal is modulated by an audio frequency. In the past, this has been considered by many to be merely a case of varying the amplitude of the carrier, or RF output. In the AM signal, however, sideband frequencies are generated, which are the results of the heterodyning of the RF signal and the AF modulation. These sidebands represent the sum of the two, and the difference of the two heterodyned frequencies. For detection by means of a conventional diode detector, one sideband is eliminated, and the other sideband is mixed with the carrier to extract the audio intelligence. This is an inefficient means of transmission, and only approximately 25 percent of the transmitted power is actually used to transmit intelligence. There are other drawbacks, also. The bandwidth of the transmitted signal is on the order of 6 kc, while the actual demodulated audio is less than 3 kc. By reducing the transmitted signal to just one sideband, and by suppressing the carrier to a value which permits using only the audio intelligence bandwidth, an effective doubling of available band use is possible, and the efficiency of transmission is increased by as much as 4 times.

There are various methods of generating a single sideband signal. The crystal lattice filter method suppresses the unwanted sideband by use of an extremely narrow bandwidth filter which allows only one sideband of a double sideband, suppressed carrier signal to pass. Carrier suppression is achieved by use of a balanced modulator in which the carrier frequency is cancelled out, and only the two sidebands, representing carrier-plus-audio, and carrier-minus-audio are generated.

NOTE

It must be remembered that in the single sideband, suppressed carrier mode of transmission, both the unwanted sideband and the carrier are only SUPPRESSED, not eliminated. Thus, with a transmitted signal from a transmitter with 40 db sideband suppression, the other, or unwanted, sideband is present, and <u>is</u>

transmitted. but it is 40 db below the wanted sideband. When this SSB signal is received at a level of 20 db over S9. the unwanted sideband will be present at a level of approximately S5. The same is true of carrier suppression. With carrier suppression of 50 db. and a signal level of 20 db over S9, carrier will be present at a level of approximately S3 to S4. Reports of nearby stations as to the level of suppression must be considered carefully.

TUNING

All signal generation is accomplished at a reference frequency of 5173.5 kc. The carrier oscillator operates at 5173.5 kc as supplied from the factory, and with this crystal the transceiver generates upper sideband signals on 20 meters, and lower sideband signals on 40 and 75 meters. For other sideband operation, a crystal operating at approximately 5176.5 kc must be used. See Page 28. The tuning dial of the Swan has two marks, USB and LSB. The area between these marks represents the passband of the crystal lattice filter, approximately 3 kc. Since the carrier oscillator is used for BFO injection in the receive position, it is not possible to receive USB signals if transmission is on LSB, and vice versa. Table I shows the frequencies used in the transceiver as shipped from the factory

TABLE I
SWAN 240 TRANSCEIVER FREQUENCIES

| Band | Tuning Range | VFO Freq. Range |
|---|---|---|
| 20 Meters | 13,990 to 14,380 kc | 8,813.5 to 9,203.5 kc |
| 40 Meters | 6,900 to 7,340 kc | 12,073.5 to 12,513.5 kc |
| 75 Meters | 3,640 to 4,030 kc | 8,813.5 to 9,203.5 kc |

The VFO tuning range on 20 and 75 meters is the same. The sum of the VFO frequency and the reference frequency, 5173.5 kc USB results in a 20 meter USB signal. On 75 meters the difference of the two frequencies is used, resulting in a 75 meter LSB signal.

The VFO operates as a frequency doubler on 20 and 75 meters, and as a tripler on 40 meters.

TRANSMIT

In the TRANSMIT position, (e.g., when the push-to-talk switch on the microphone is pressed or when the Function switch is moved to "TRANSMIT"), the transmitter generates a single sideband signal at the same frequency being received. (See Fig. 1 and the Schematic Diagram, Figure 8 ) The 5173.5 kc carrier is generated by V13, the Crystal Carrier Oscillator. This stage is a dual function oscillator-isolation amplifier. The triode of the 6U8A operates as a Pierce Oscillator, with the crystal in parallel resonance and operates on both receive and transmit. The pentode section of the tube is an untuned isolation amplifier which is biased to cutoff in the receive position. When transmitting, the RF output of the isolation amplifier is injected into the control grid of the balanced modulator, V9. Audio from the Mic. Amp. V11, a 12AU7, is coupled to the beam deflection plates of the balanced modulator. The output of the balanced modulator, thus contains both upper and lower sidebands, but with the carrier suppressed. The two sidebands are then coupled through the crystal lattice filter, FL-1, which suppresses the lower sideband, and feeds the upper sideband signal to the first IF Amplifier, V7. The output of the IF Amplifier is fed to the signal grid of the Transmitter Mixer, V3, where it is mixed with the output of the VFO, V4. The output of the mixer and the output of the Driver, V2, are gang-tuned by the Exciter Tuning control, and the output of the Driver excites the grid of the Power Amplifier, VI. The output of the Power Amplifier is tuned through the Pi-network, and loading accomplished through the PA Load control, C11. During transmit, all other tubes are biased to cutoff through K1, which is energized through the Function Switch, or Push-to-talk.

RECEIVE

In RECEIVE position, the output pi-network, L1-C107-C102 forms the input to the receiver RF Amplifier, V5. In receiving, K1 is de-energized, and applies cutoff bias to all tubes normally used only in transmit. See Figure 2. The plate circuit of the Transmitter driver is used as the plate circuit of the RF amplifier, one or the other being biased to cutoff through K1. The received SSB signal, amplified through V5, is

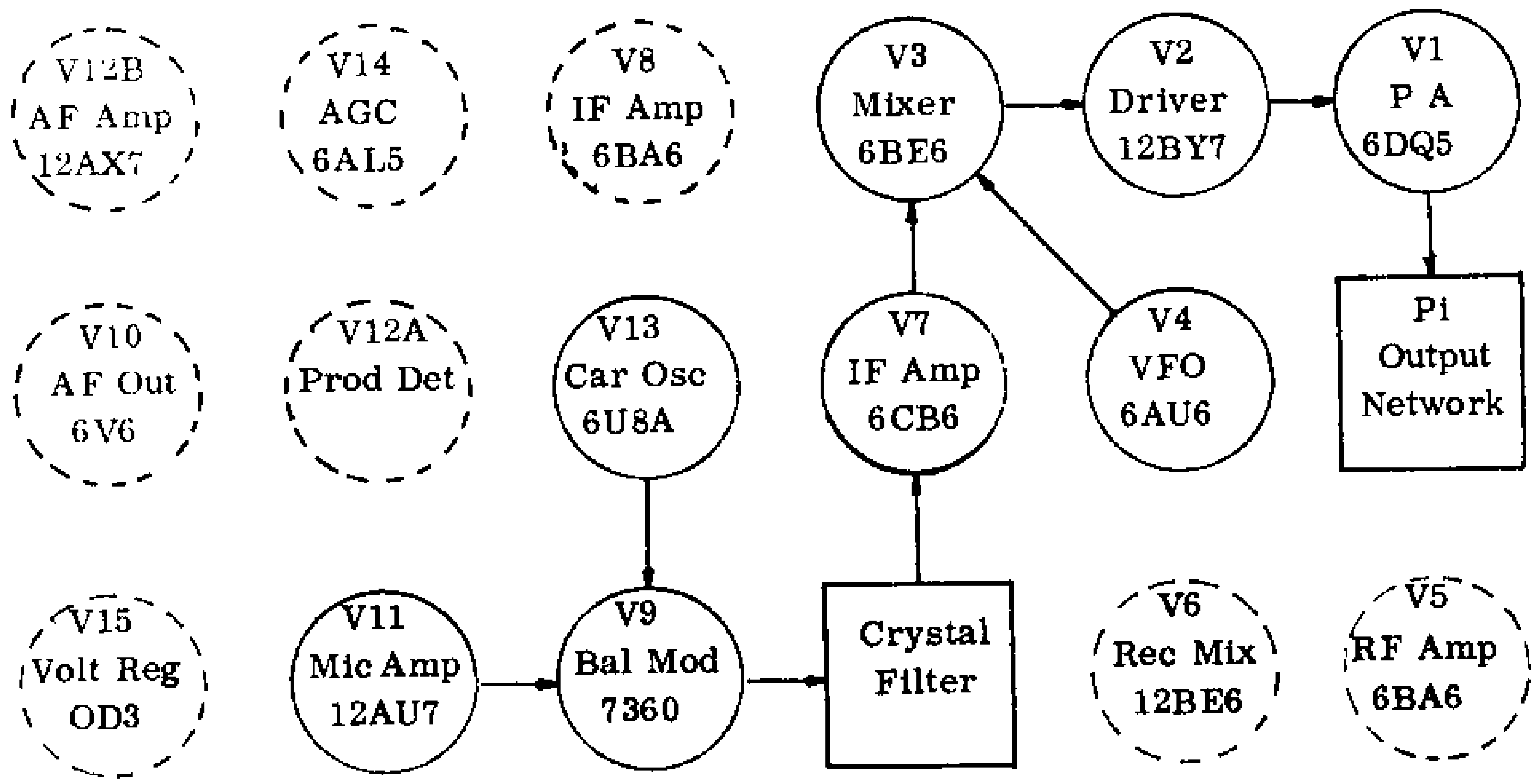



FIGURE 1. BLOCK DIAGRAM, TRANSMIT POSITION

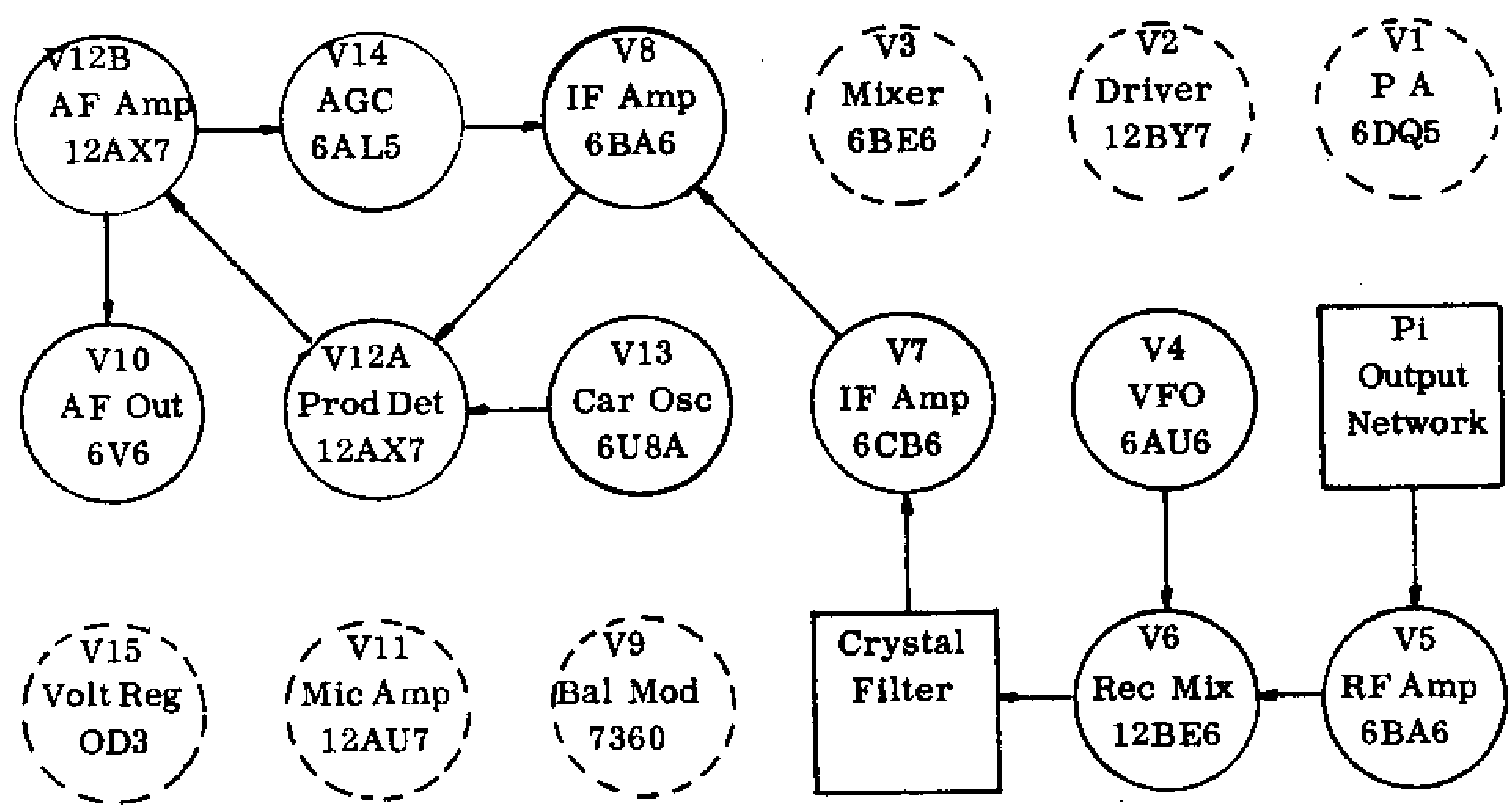



FIGURE 2. BLOCK DIAGRAM° RECEIVE POSITION

fed to the signal injection grid of V6, the receiver mixer. The oscillator injection grid of the mixer is fed from the VFO, at the same frequency as used in transmit. The output of the mixer, a SSB signal centered at 5174.5 kc is fed through the crystal lattice filter, FL-1 to the two IF stages V7 and V8, then to the Product Detector, V12. BFO injection from the carrier oscillator, at 5173.5 kc, is fed to the Product Detector, effectively "reinserting carrier" at the transmit frequency and allowing detection and demodulation of the proper sideband. The detector audio output is amplified through two stages, the other half of V12 and the AF output, V10.

TUNE

Normally, the frequency of the carrier oscillator is approximately 300 cps outside the passband of the crystal lattice filter. In TUNE position, the transceiver is placed in normal transmit condition, but one deflection plate of the balanced modulator is grounded, completely unbalancing the modulator, and capacitor C1301, normally connected to chassis ground, in the carrier oscillator is removed from ground. The carrier oscillator crystal operates in parallel resonance, and capacitors C1301 and C1302 are effectively across the crystal. The oscillation frequency of the crystal is controllable through a limited range by the value of these two capacitors, and the exact frequency of oscillation is determined by this capacitor network. In TUNE position, C1301 is removed from the circuit, and the frequency is determined solely by C1302. This moves the carrier frequency into the passband of the crystal filter, and with the modulator unbalanced, tuning is accomplished with full carrier drive.

## IMPORTANT NOTE

It is essential that transmitter tuning be accomplished at full drive to the power amplifier. The power amplifier is operated as a linear amplifier, and loading on this tube affects the linearity. If the transmitter is tuned to a certain loading, operation on SSB to peaks above that loading will result in non-linear operation or "Flat-topping". The cathode current meter cannot follow the syllabic variations in cathode current normal in SSB operation, and it indicates between 1/3 and 1/2 of the actual peak current. It is essential that the power amplifier average current, as shown by the meter, be less than half the peak cathode current used in tuning to avoid flat-topping. This is controlled by proper setting of the Mic. Gain control.

## CRYSTAL FILTER

Sideband suppression is accomplished with a high frequency crystal filter consisting of two half lattices operating back-to-back. The crystal frequencies are 5173.5 and 5175.5 kc. The passband of the filter, centered at 5174.5 kc, is approximately 3 kc, and the shape of the response is such that the lower sideband, (5173.5 minus audio) is suppressed 40 db below the upper sideband, (5173.5 plus audio). This filter is suitable for operation on the other sideband, provided a crystal oscillator frequency of approximately 5176.5 kc is used. This crystal must be suitably matched to the oscillator circuit, and should be calibrated for a load of 20 picafarads. Commonly available crystals, made to work with 32 picafarads, will not function satisfactorily in this circuit.

## BALANCED MODULATOR

V9, the 7360 Balanced Modulator generates the double sideband suppressed carrier signal which is subsequently fed through the crystal lattice filter. This balanced modulator is a beam deflection type, and operates similar to a cathode ray tube in that the electron beam from the cathode is deflected to one output plate or the other by the charge appearing on the deflection plates. RF energy from the crystal oscillator is fed to the input grid of the modulator. In the absence of audio, the deflection plate reference voltages are adjusted by means of the carrier balance potentiometer so that the RF being fed to each output plate is equal. The two output plates feed the carrier to transformer T1 in push-pull, and the two signals cancel each other out in the output of T1. Audio from the Mic. Amplifier, V11, is superimposed upon one deflection plate, unbalancing the modulator, and the two sidebands resulting from sum and difference frequencies of the audio and carrier, appear as a double sideband, suppressed carrier signal in T1, with the carrier suppression being approximately 50 db.

## CONTROLS

Functions of the various front panel controls are as follows:

| | |
|---|---|
| <u>FILAMENT SWITCH</u> | **Controls main power to the transceiver, and provides 12 volts ac or dc to the filaments.** |

| | |
|---|---|
| FUNCTION SWITCH | Controls the various modes of operation of the transceiver. |
| Off | All power to the transceiver is disabled with the exception of the 12 volt filament. |
| Receive | 12 volts dc is provided to the relay circu high and medium voltages supplied to the plate circuits, and bias voltage is provided to the relay controlled circuits. |
| Transmit | 12 volts dc circuit through relay K1 is completed, and all tubes used only in receive are biased to cutoff. High and medium voltages are supplied to the plat circuits. |
| Tune | All circuits for transmit are energized. as above, but one deflection plate of the balanced modulator is grounded, capacitor C1301 in the carrier oscillator is removed from ground, and limiting resistor R1308 is switched in series with the P.A. screen grid to protect the tube from excessive screen dissipation. |
| MICROPHONE GAIN | Controls potentiometer R1104 in the grid of V11, and controls amount of audio to the balanced modulator. |
| CARRIER BALANCE | Controls potentiometer R908 in the balanced modulator deflection plate circuit, and permits balancing of the carrier. |
| RF GAIN | Controls variable resistor R 904 which is common in the cathodes of V5, RF amplifier, V6 Rec. Mixer, and V8, 2nd IF Amplifier, controlling gain of these stages. |
| AF GAIN | Controls potentiometer R1002 in grid circuit of V10 AF output, and varies the gain of the final audio output amplifier. |
| MAIN TUNING | Controls C415, frequency determining tank circuit of V4, VFO. |

| | |
|---|---|
| PA TUNE | Controls C107 in pi-network to tune final power amplifier plate to resonance. |
| PA LOAD | Controls C102 in pi-network to match impedance of output load. |
| VFO BANDSWITCH | Switches C408 in the VFO tank circuit to lower VFO grid frequency for 40 meters. and C406 to lower VFO plate frequency for 20 and 75 meters. |
| MAIN BANDSWITCH | Switches, plate coils and associated capacitors of transmit mixer, V3 and transmitter driver, V2. Also switches tank coil of pi coupling system, and associated capacitors. |
| PA BIAS ADJUST | This control is located on the back panel and adjusts the amount of bias on V1, Power Amplifier. |

## IV INSTALLATION

The Swan 240 transceiver has been designed to provide the utmost in ease of operation, stability, versatility, and enjoyment. Maximum enjoyment from your Swan will depend to a great extent on the installation. For fixed station or portable use, operation with the SW-117AC power supply provides a compact arrangement with maximum ease of operation. All switching is performed in the transceiver, and either speaker or headphone output is available in the power supply. For mobile installations, the SW-12DC supply provides similar switching arrangements, and speaker output may be fed through the car broadcast receiver speaker.

### POWER SUPPLY

The Swan models SW-117AC and SW-12DC power supplies provide all necessary voltages required by the SW-240 transceiver. The SW-117AC comes equipped with a pre-wired plug and cable, all ready for plugging into the SW-240. It also includes a 5 x 7 speaker, and thus the two packages make a complete station. The SW-12DC supply for mobile operation includes all necessary cables, connector plug, fuses, and installation hardware. The Jones Plug for connection to the transceiver is pre-wired at the factory.

Power requirements of the SW-240 are shown in the following table. Pin connections to the Jones type power connector are also listed as an aid in connecting other brands or home-brew type power supplies.

SW-240 POWER REQUIREMENTS

| S-312 Jones Plug | | Nominal | Minimum | Maximum |
|---|---|---|---|---|
| High Voltage Transmit Only | Pin 8 | 600-800 VDC 25-300 MA | 250 VDC Low Power | 1000 VDC 350 MA |
| Medium Voltage Rec. & Transmit | Pin 10 | 275 VDC 100 MA | 225 VDC | 325 VDC |
| Bias Voltage Rec. & Transmit | Pin 3 | -100 VDC 5 MA | -70 VDC | -120 VDC |
| Filament Voltage | Pin 4 | 12.6 v AC or DC 3.45 amperes | 11 Volts | 14.5 Volts |
| Relay Supply | Pin 5 | 12 VDC 100 ma | 10 VDC | 14.5 VDC |
| Common | Pin 6 | | | |
| Spkr. Voice Coil | Pin 12 | | | |
| Toggle Switch | Pins 1 & 2 | | | |
| Function Switch, Off Position | Pins 7 & 9 | | | |

SPEAKER CONNECTIONS

Audio output from the transceiver is provided at pin 12 of the Jones plug. The other speaker lead goes to the common chassis ground at pin 6. Output impedance is between 3 and 4 ohms. The SW-117AC power supply contains a high quality 5 in. by 7 in. oval speaker, which provides a pleasant voice quality. In mobile installations, the car broadcast receiver speaker may be used, in which case a double pole, double throw switch should be installed as a selector. If the car radio speaker placement is not satisfactory, a separate speaker may be desireable. Headphones may be used with the a-c supply by plugging them into the phone jack on the power supply. High impedance phones may be used--the power loss caused by the mismatch will drop the volume level to about the desired amount for headphones.

MICROPHONE

The microphone input is designed for high impedance, low level microphones, only. DO NOT ATTEMPT TO USE CARBON MICROPHONES. The choice of microphone is important for good speech quality, and should be given serious consideration. The crystal lattice filter in the transceiver provides all the restriction necessary on audio response, and further restriction in the microphone is not required. It is more important to have a microphone with a smooth, flat response throughout the speech range. The microphone plug should be a standard 1/4 in. diameter three-contact type. The tip connection is for push-to-talk relay control, the ring connector is for the microphone terminal, and the sleeve is for the common chassis ground. The manufacturer's instructions should be followed in connecting the microphone cable to the plug. With many microphones, the push-to-talk button must be pressed to make the microphone operative, even though the panel function switch is in the transmit position. This feature may be disabled, if desired, by opening the microphone case and permanently connecting the contacts which control the microphone.

ANTENNA

Any of the common antenna systems designed for use on the high frequency amateur bands may be used with the Swan transceiver, provided the input impedance of the transmission line is not outside the capability of the pi-output matching network. An antenna which reflects a standing wave ratio on 50 or 75 ohm transmission line, below approximately 3:1 at the proposed operating frequency, or a system that results in a transmission line input impedance that is essentially resistive and between 20 and

300 ohms will take power from the transceiver with little difficulty. If tuned open-wire transmission line is used to excite the antenna, a suitable antenna tuner should be used between the transceiver and the antenna to provide a reasonable impedance match between the unbalanced coaxial output and the balanced open-wire line. Methods of constructing and operating such tuners are described in detail in the ARRL Antenna Handbook, and similar publications. For operation on the 75- and 40-meter bands, a simple dipole antenna, cut to resonate in the most used portion of the band, will perform satisfactorily. For operation on the 20-meter band, the efficiency of the station will be greatly increased if a good directional rotary beam antenna is used.

For mobile operation, the antenna should be mounted in such a manner as to reduce the detuning effect of changes in the relation of the antenna to the car body. Use of a multi-band antenna is recommended, although the overall efficiency of the antenna installation may be somewhat less than that of a "high-Q" single band antenna. The ease of band changing and the increased enjoyment of using your Swan on all three bands will more than make up for it. For mobile operation, a simple RF field strength meter is essential, and a reflected power meter or SWR bridge in the transmission line will be helpful. If operation is going to be primarily mobile, it is suggested that the tuning dial setting be made with the transceiver installed, to minimize the effect of parallax error in tuning.

## V OPERATION

WARNING!

DANGEROUS HIGH VOLTAGE IS PRESENT ON THE PLATE OF THE POWER AMPLIFIER WHENEVER THE POWER SUPPLY IS ENERGIZED. NEVER TURN POWER ON WHEN THE POWER AMPLIFIER COVER IS REMOVED. HIGH VOLTAGE IS ALSO PRESENT AT PIN 8 OF THE POWER CONNECTOR.

### RECEIVING

a. Connect power supply, speaker, if required, and antenna to the transceiver.

b. Turn Filament Switch to ON position, allow 30 seconds warm up, with Function switch in OFF position.

c. Turn Function Switch to RECEIVE position. Set RF gain to full 5 o'clock position and gradually advance AF gain control. A background hiss should be heard in the speaker.

d. Set PA tune, PA load, and Exciter Tune Controls to mid-scale position. Adjust main tuning control to tune in on a signal, then adjust these controls for maximum volume. Note - This is to be done only if the transmitter portion has not been previously tuned. After the transmitter has been tuned, then PA tune, PA load, and Exciter tune need not, and should not, be adjusted when receiving.

e. The AF gain control is normally used for adjusting volume level. The RF gain control may be left at full clockwise position most of the time, in which case the AGC, (Automatic Gain Control) system will have maximum control. Some operators may find it preferable, however, to set the RF gain control at 4 o'clock or 3 o'clock in order to limit the background noise level, particularly in mobile operation. Full AF gain, and volume adjustment with the RF gain control, only, will provide minimum background noise but also only partial AGC control. Thus, the ratio between these controls will be a factor for the operator to determine and will depend on various conditions.

## TRANSMITTING

a. Preliminary Step 1. Check for proper operation of the transmit-receive relay by turning function switch to TRANSMIT position, and immediately back to RECEIVE, listening for click of the relay. Do not allow the transceiver to remain in TRANSMIT position in untuned state for more than a few seconds. Plug the microphone into the Mic. Jack on the rear of the transceiver and check relay operation by pressing push-to-talk switch, if so equipped, with Function switch in RECEIVE.

b. Preliminary Step 2. PA bias adjustment. This adjustment must be made when first operating from a new power supply, and whenever resting PA current exceeds specified value.

1. Turn Function Switch to TRANSMIT position, adjust Carrier Balance for minimum meter reading.
2. Use PA Bias Control on back of the transceiver to adjust the meter reading to 25 ma. Make sure that Carrier Balance control is set to minimum meter reading when making this adjustment. The idling or resting current may vary somewhat from time to time, but should be held within the range of 20-30 ma.

c. Transmitter Tuning.

1. Set tuning dial to desired part of band. Set PA load to minimum, full CCW position.
2. Turn Function Switch to TUNE position. Adjust PA tune for dip in meter reading, then adjust Exciter Tuning for maximum reading. Increase PA load clockwise until meter reads approximately 160 ma., and readjust PA tune for dip. Repeat these adjustments until PA tune dips to about 160 ma. Be sure Exciter tuning is adjusted for peak reading.

NOTE

Loading to 160 ma in TUNE position is equivalent to approximately 350 ma load in TRANSMIT position. A protective limiting circuit is incorporated to prevent PA tube damage during tuneup.

## SW-240 SINGLE SIDEBAND TRANSCEIVER-SWAN ELECTRONICS CORPORATION

TUNING DIAL: Your SW-240 dial window is equipped with a transparent red indicator band. This band is approximately 3.5 kc wide, and indicates the portion of the spectrum to which you are tuned, and in which you are transmitting. Carrier frequency is indicated by either the left edge or the right edge of this red band, depending on which sideband is being used. The SW-240 as shipped from the factory operates lower sideband, (LSB), on 75 and 40 meters, so on these bands the right edge of the red band indicates carrier frequency. On 20 meters the upper sideband, (USB), is standard, and so the left edge reads carrier frequency. This arrangement not only provides you with a picture of the passband being occupied by your signal, but also facilitates future installation of the opposite sideband, should this be desired.

TUNING INSTRUCTIONS-CONDENSED:
(See Operating Manual for Complete Details)

1) Set Function Switch to TRANSMIT. Quickly adjust CAR. BAL. for minimum reading.

2) Check P. A. idling current. Should read between 20 and 30 ma. Set with P. A. Bias Control on back of Transceiver.

3) Set P. A. LOAD at minimum 9 o'clock. Switch to TUNE, and quickly adjust P. A. TUNE for dip in meter reading.

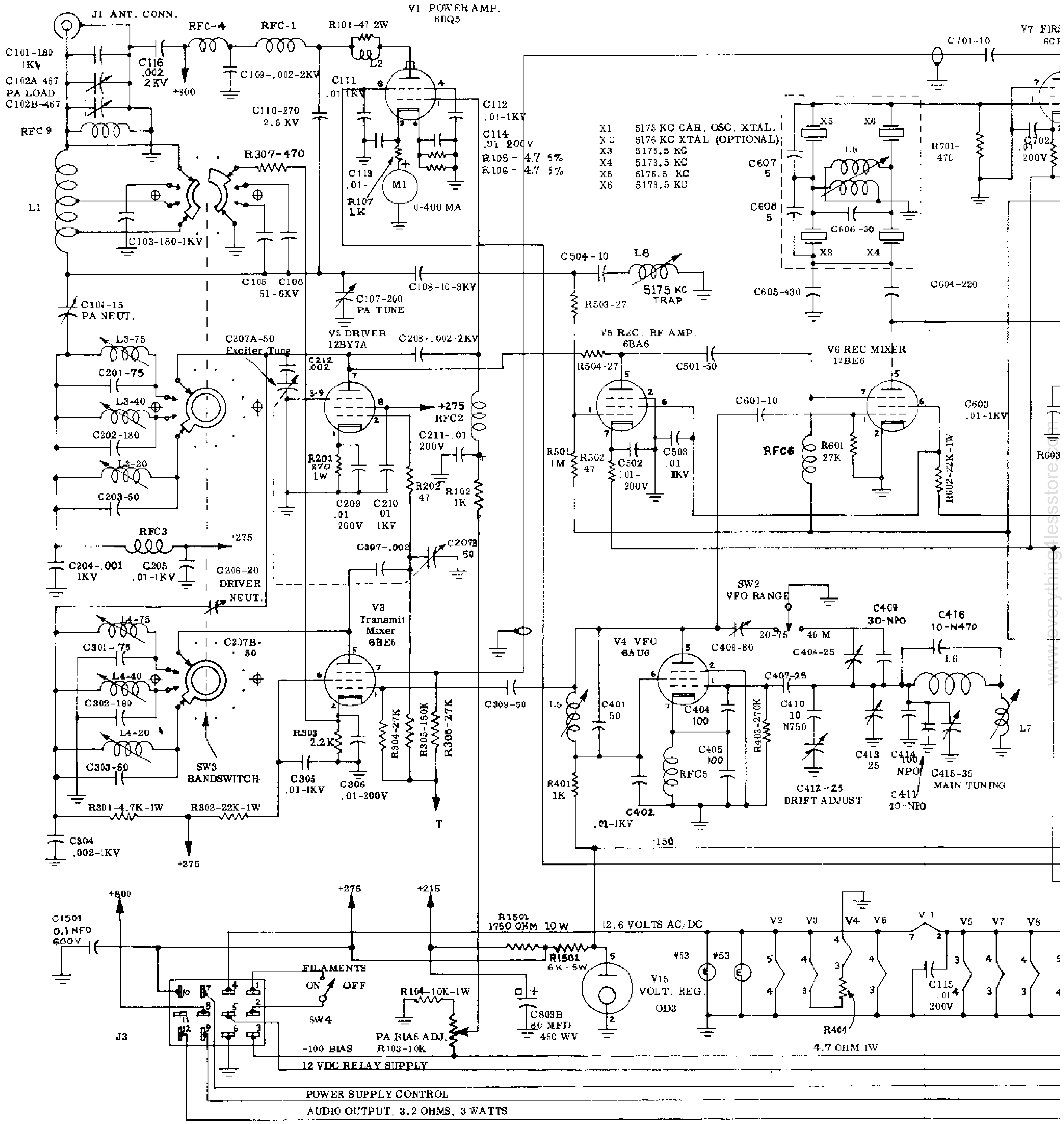
4) Advance P. A. LOAD gradually until P. A. TUNE dips to 160-180 ma. NOTE: This amount of loading in "tune" position is equivalent to approx. 350 ma. peak input during voice modulation. Your SW-240 now incorporates a protective limiting circuit which holds screen grid voltage down during tune-up in order to avoid excessive dissipation in the final amplifier tube.

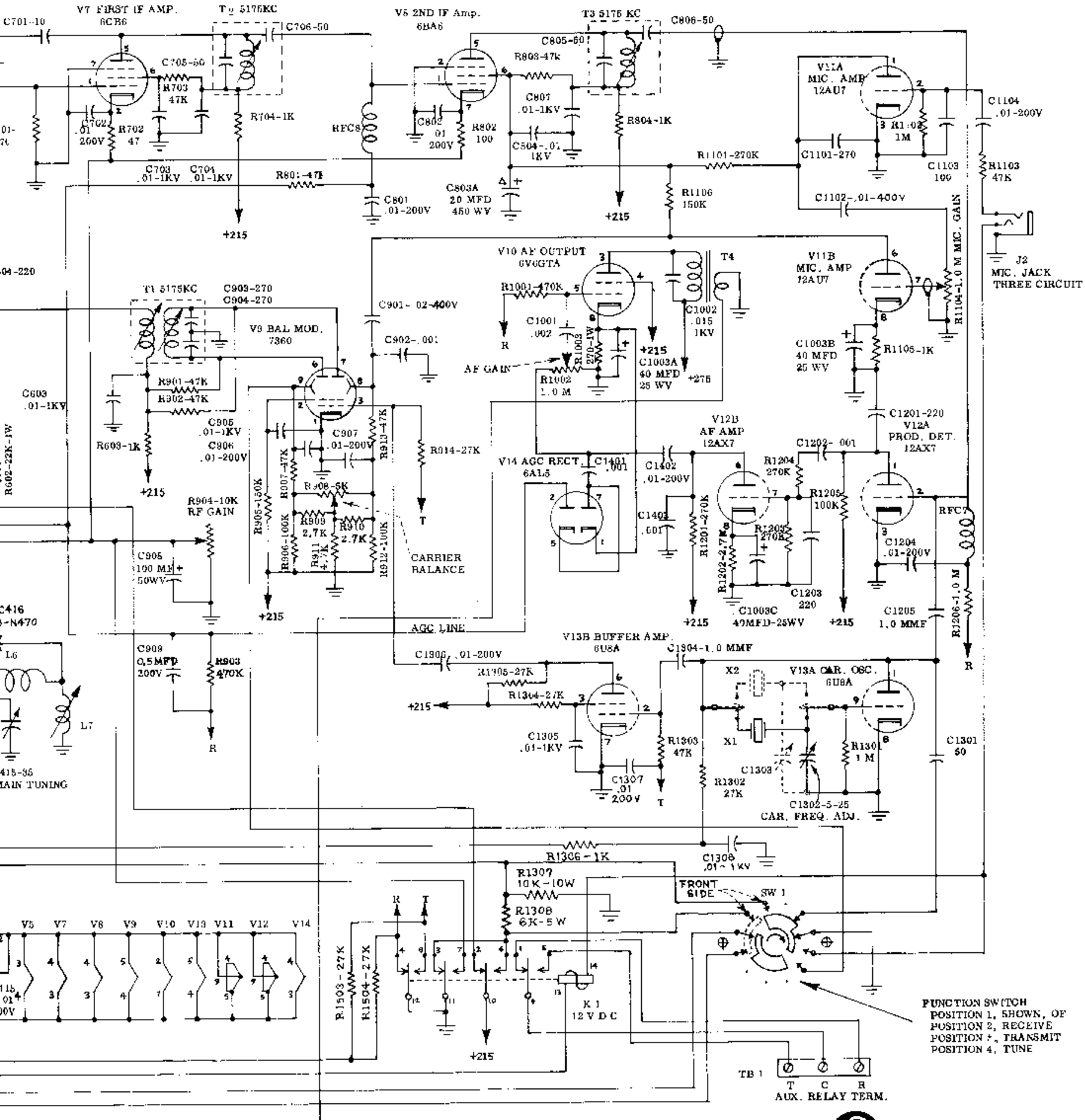
5) Switch back to TRANSMIT, advance MIC. GAIN to 9 o'clock, and modulate. Adjust MIC. GAIN so voice modulation averages 125 ma. Peaks will swing over this level, but they should seldom reach 200 ma. Avoid over modulation.

CAUTION: DO NOT HOLD TRANSCEIVER IN TUNE POSITION FOR LONGER THAN 30 SECONDS.

If more time is required for tuning, allow about a minute for cooling.

REMEMBER: KEEP THE MIC. GAIN DOWN


J1 ANT. CONN.
V1 POWER AMP.
6DQ5
RFC-4
RFC-1
R101-47 2W
L2
C701-10
V7 FIR
C101-180 1KV
C116 .002 2KV
+800
C109-.002-2KV
C111 .01 1KV
C102A 467 PA LOAD
C102B-467
C110-270 2.5 KV
C112 .01-1KV
C114 .01 200V
R105 - 4.7 5%
R106 - 4.7 5%
RFC 9
R307-470
C113 .01-
R107 1K
M1
0-400 MA
L1
C103-150-1KV
X1 5173 KC CAR. OSC. XTAL.
X2 5176 KC XTAL (OPTIONAL)
X3 5175.5 KC
X4 5173.5 KC
X5 5175.5 KC
X6 5173.5 KC
X5
X6
L8
C607 5
C608 5
C606 -30
X3
X4
R701-470
C702 .01 200V
C105
C106 51-6KV
C108-10-6KV
C504-10
L8
5175 KC TRAP
C605-430
C604-220
C104-15 PA NEUT.
C107-200 PA TUNE
R503-27
L3-75
C207A-50 Exciter Tune
V2 DRIVER 12BY7A
C208-.002-2KV
V5 REC. RF AMP. 6BA6
V6 REC MIXER 12BE6
C201-75
C212 .002
R504-27
C501-50
L3-40
+275
RFC2
C601-10
C603 .01-1KV
C202-180
C211-.01 200V
R501 1M
R502 47
C502 .01-200V
C503 .01 1KV
RFC6
R601 27K
R602-22K-1W
R603
L3-20
R201 270 1W
R202 47
R102 1K
C203-50
C209 .01 200V
C210 .01 1KV
RFC3
+275
C204-.001 1KV
C205 .01-1KV
C206-20 DRIVER NEUT.
C307-.002
C207B 50
SW2 VFO RANGE
L4-75
V3 Transmit Mixer 6BE6
C301-75
C207B-50
L4-40
V4 VFO 6AU6
C406-80
20-75
40 M
C408-25
C409 30-NPO
C416 10-N470
L6
C302-180
C309-50
L5
C401 50
C404 100
C407-25
C410 10 N750
R403-270K
L7
L4-20
R303 2.2K
R304-27K
R305-150K
R306-27K
C405 100
RFC5
C413 25
C414 100 NPO
C415-35 MAIN TUNING
C303-50
SW3 BANDSWITCH
C305 .01-1KV
C306 .01-200V
R401 1K
C412 -25 DRIFT ADJUST
C411 20-NPO
R301-4.7K-1W
R302-22K-1W
C402 .01-1KV
T
-150
C304 .002-1KV
+275
+800
+275
+215
C1501 0.1 MFD 600 V
R1501 1750 OHM 10 W
12.6 VOLTS AC/DC
V2
V3
V4
V6
V1
V5
V7
V8
R1502 6K - 5W
FILAMENTS
ON
OFF
#53
#53
V15 VOLT. REG. OD3
C115 .01 200V
SW4
R104-10K-1W
C808B 80 MFD 450 WV
J3
PA BIAS ADJ. R103-10K
-100 BIAS
R404 4.7 OHM 1W
12 VDC RELAY SUPPLY
POWER SUPPLY CONTROL
AUDIO OUTPUT, 3.2 OHMS, 3 WATTS




SWAN
ENGINEERING CO.
417 Via Del Monte Oceanside, Calif.